

An Improved Method for Opening Profile Zippers

Inventor: Russell S. Kikuchi

| References Cited | | | |
|------------------|------------|------------------|------------|
| 3425469 | Feb., 1969 | Ausnit | 150/003. |
| 5009828 | Apr., 1991 | McCree | 264/177.1. |
| 5314940 | May., 1994 | Stone | 524/271. |
| 5453219 | Sep., 1995 | Smrt , et al. | 252/30. |
| 5464154 | Nov., 1995 | Nielsen | 239/1. |
| 5670202 | Sep., 1997 | Guzowski , et al | 427/8. |
| 5711609 | Jan., 1998 | Simonsen | 383/63. |
| 5931582 | Aug., 1999 | Nichols | 383/65. |

| Foreign Patent Documents | | | |
|--------------------------|------------|----|-------------|
| 089680 | Sep., 1983 | EP | B65D 33/00. |

Description

FIELD OF THE INVENTION

The present invention relates to rib and groove profile zippers. This invention more particularly pertains to profile zippers as related to reclosable polymeric bags.

BACKGROUND OF THE INVENTION

Reclosable polymeric bags having interlocking pressure-sealable profile zippers have been available to consumers for nearly thirty years. Within this span of time, many improvements in design and manufacturing were implemented. Hundreds of new uses were discovered. Today, it is ubiquitous throughout the world.

Still, there is room for improvement. The required use of both hands for opening a reclosable polymeric bag has never been addressed and always been accepted. The lack of any pertinent prior art supports this assertion. The ability to open a bag effortlessly with one hand significantly improves convenience. It would benefit some of the "physically challenged" as well.

Variance in forces is another concern. Although minimized with profile designs such as U. S. Patent No. 5,558,613, there is still a fine balance between the consumer's ability to easily open a bag and preventing inadvertent penetration from the outside of the bag. This variance in forces places a constraint on profile design. Both closure strength and the force required for profile disengagement are compromised to some degree.

The two limitations just mentioned are actually inherent to the operational process. Said process is known in prior art as the profile disengagement process which involves the separation of two interlocking profile members. Two opposing flanges at the bag's mouth are held, one in each hand, at their longitudinal center. Said flanges are then pulled in opposite directions, away from the bag and perpendicular to the longitudinal axis of said profile. This process is typically enabled by some form of grip. Prior art has evolved without much change to the basic orientation of said grip. The surface texture is always situated to provide grip for pulling away from the bag and profile. For example, in reference to U.S. Patent No. 5,009,828, grips in the form of ribs are extruded longitudinally onto flanges across the lip of the bag. This is known in the art as grip strips. The aforementioned process for opening a profile zipper and its associated grip orientation pervade prior art and are currently the status quo.

BRIEF SUMMARY OF THE INVENTION

The present invention is an improved method to disengage interlocking members of rib and groove profile zippers without sliding elements. This process is enabled by a new grip arrangement. Both said process and said means are unobvious and novel as evidenced by 30 years of exclusion from prior art.

The pinch-snap process is enabled by a new grip arrangement and unique profile design. This new grip is positioned on or adjacent to both profile member surfaces opposite their interlocking elements. Said grip is situated in such a manner as to provide surface friction in both directions along the longitudinal axis of the profile. This differs considerably from prior art, which provides surface friction at right angles away from the profile's longitudinal axis. Texture orientation, relative position to profile, and pure intent are attributes of the grip arrangement which are unique to prior art and therefore characterize or earmark the pinch-snap process. The *Detailed Description of the Preferred Embodiment* section offers, by way of example rather than limitation, three grip arrangements which are all embodiments of the present invention.

The pinch-snap process prescribed by the present invention pushes the profile apart from its longitudinal center. Throughout this process, both profile surfaces opposite the interlocking elements maintain a parallel or "balanced" relationship. In the case where force is inadvertently applied to one of the profile's lateral edges, the parallel relationship becomes skewed or "unbalanced." A profile can be designed to lock in this situation, providing maximum closure strength thereof. This aspect of the present invention serves as the basis for a profile design which offers minimal resistance when balanced and maximum closure strength when unbalanced. This enables effortless consumer access when using the pinch-snap process while providing maximum closure strength from both within and without the bag. Prior art concerns with "variance in forces" are thereby eliminated. The present invention discloses as the preferred embodiment, a simple profile design which takes advantage of this particular attribute. Refer to *Detailed Description of the Preferred Embodiment*.

Grip strips are unnecessary within the scheme of the pinch-snap process. Its omission from design saves on raw materials during manufacturing. Also, the absence of grip strips, the aforementioned balanced profile seal and the non-intuitive nature of the pinch-snap process, collectively promote child-resistant properties. These properties exceed similar claims in prior art (see U.S. Patent No. 5,931,582 and 5,711,609) by offering a higher degree of convenience while increasing overall effectiveness.

after the seal is broken. This is the only area on the polymeric bag which necessitates a grip. A coextensive grip is unnecessary. Consequently, the "target area" for the aerosol application of the non-slip coating is the center of the profile zipper's longitudinal axis as shown in FIG. 6-60. Depicted as section 60, the target area extends outward from the profile's longitudinal center, 0.5" in both directions along the longitudinal axis and 0.5" down from the lip of the bag. The disclosed target area dimensions are intended as examples, rather than limitations. There should be a mirror image of this grip arrangement on the opposite exterior wall of the polymeric bag. Said target area should be kept to a minimum length along the longitudinal axis to prevent any significant obstruction when sliding fingers over the profile 61 during the sealing thereof.

Many viable means for applying aerosol coatings are available. For example, U.S. Patent No. 5,464,154 and 5,670,202 disclose several processes which provide a momentary spray using a mask for accuracy and peripheral vacuum to collect any overspray. According to prior art, the typical manufacturing process starts with profile members being extruded onto a continuous polymeric sheet. The sheet is folded and heat-sealed to form a chain of pouches. These pouches are then severed at the seal to form individual reclosable polymeric bags. After the heat-sealing process, the physical dimensions of each individual bag are defined, thereby making it possible to target the longitudinal center. Before severing, the bags are still connected in a continuous chain making it possible to control their positioning. Consequently, the non-slip coating should be applied just after the sealing station but before the severing station.

The following grip arrangements are alternate embodiments of the present invention. Although coextensive grips are unnecessary, the manufacturing process is simplified with a coextruded profile and grip.

FIG. 7 is another embodiment of the present invention in the form of an integral grip arrangement. The coextruded longitudinally coextensive profile sections 70 are of a copolymer blend consisting of a non-slip "wet friction" compound. U. S. Patent No. 5,314,940, hereby incorporated by reference, describes a compound with a surface friction that increases under damp conditions. Said compound does not use any

particulate material and includes a hydrogenated polybutene plasticizer as one of its preferred formulations. Amoco Chemical Company of Chicago, Illinois manufactures said compound under the designation H-300. The walls of the polymeric bag 71 are bonded to the inner face 72 of coextruded flanges 73. The flanges are necessary to expose non-slip surfaces 74 to allow for gripping.

FIG. 8, which is another embodiment of the present invention, is a roller embossed grip arrangement wherein a coextruded flange is embossed with a grip pattern 80. The opposing flange adjacent to the opposing profile member is identically embossed. European Patent No. 0089680 details a roller embossing process wherein a fresh extrusion, partially cooled, passes through a pair of rollers. One roller of said pair with a grip pattern inscribed thereon, impresses its surface texture onto said polymeric resin extrusion. This process may be used on profile coextrusions without any heat deformity, as long as the profile members are not on the opposite side of the surface being embossed. FIG. 8A, taken along reference line 8A—8A in FIG. 8 is the cross-sectional view. It exemplifies a grip arrangement conducive to roller embossing wherein the surface being embossed 80 is clear of any profile elements on its inner face 81.

While several specific embodiments of the invention have been shown and described in some detail, it will become apparent to those versed in the art that a number of other embodiments are possible which are still fairly within the scope of the general teachings and principles found herein.